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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/705,679	11/03/2000	Takeshi Nishimura	4296-124	6276

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EXAMINER

WACHTEL, ALEXIS A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 02/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/705,679

Applicant(s)

NISHIMURA ET AL.

Examiner

Alexis Wachtel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1-25-2004.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Detailed Action

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 provides for the use of the apparatus claimed in claim 1, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim 11 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US

4,256,783 to Takada et al in view of US 4,436,146 to Smolarek and US 4,142,581 to Yoshitomi et al.

Takada et al disclose a shell and tube type reactor comprising:

Per claim 1: a shell in which a plurality of reaction tubes are held with a first tube sheet (Fig.1, item 4) and a second tube sheet (Fig.1, item 5) in the reactor; a raw material inlet (Fig.1, item 28) equipped in the first tube sheet side of the shell; a product outlet (Fig.1, item 29) equipped in the second tube sheet side of the shell; an intermediate tube sheet (Fig.1, item 10) provided horizontally in the shell.

With respects to claims 1-3, Takada et al fail to teach wherein the reaction tube is expanded to three grooves formed in the reaction tube-fixing part of the intermediate tube sheet for substantially shielding spaces between the tubes and the intermediate tube sheet and for forming plural of chambers. Yoshitomi et al teach a tube-hole for an expanded tube to tube sheet joint which is formed by expanding the tube securely in the tube hole by means of a tube expander and still attains greater bond strength and water tightness at the joint than in conventional joints (Col 1, lines 56). The tube-to tube sheet joint is attained by providing a tube hole structure having at least one circumferential groove on the surrounding wall of each hole of a tube sheet in which each tube member is radially expanded to give a tube to tube sheet joint (Col 1, lines 57-61). (The Examiner notes that Takada et al clearly enables for two or more grooves). Per Fig.3, 1A illustrates a groove, 2 illustrates a tube, and 1 illustrates a tube sheet. In view of this teaching it would have been obvious to one of ordinary skill to have used a tube sheet sealing means using one, two

or three grooves formed in the tube sheet. One of ordinary skill would have been motivated by the desire to improve the bond strength and water tightness of the tube-sheet joint with the tube.

With respects to claims 1 and 5, Takada et al fail to teach an expansion joint formed around the periphery of each of the chambers and wherein the expansion joint is roughly semicircular, with the inner face of the joint directed toward the inner side of the reactor and the upper and lower ends of the joint connected to the almost horizontally cut shell of the reactor. Smolarek teaches the use of expansion joints in reactor shells for the purpose of reducing the tensile or compressive loading between tube sheets and the reactor shell resulting from either the internal pressurization of the reactor shell or the existence of a pressure gradient between the tube and shell which would tend to cause an unequal expansion or contraction there between (Col 8, lines 5-14). In view of this teaching it would have been obvious to one of ordinary skill to have included expansion joints as disclosed by Smolarek in the region between the tube sheet (for both first and second tube sheets) and reaction shell motivated by the desire to improve the structural integrity of the resulting reactor.

Per claim 4: wherein a number of the chambers formed is two (Fig.1, items A and B).

With respects to claim 6, the references as set forth above fail to teach wherein the amount of water migrating from the upper chamber to the lower chamber fulfills the relation, amount of leakage (ml/hour per reaction tube) $\leq 1.27 \times 10^{-5} \times$ pressure difference (Pa), in a hydraulic test. However, given that Yoshitomi et al teaches the use

of the same tube sheet/tube sealing means, it is fairly reasonable to assumed that the apparatus of the prior art would leak just as much or less than claimed.

With respects to claim 7, the references as set forth above fail to teach wherein the amount of water migrating from the lower chamber to the upper chamber fulfills the relation, amount of leakage (ml/hour per reaction tube) $\leq 1.27 \times 10^{-5} \times$ pressure difference (Pa), in the hydraulic test. However, given that Yoshitomi et al teaches the use of the same tube sheet/tube sealing means, it is fairly reasonable to assumed that the apparatus of the prior art would leak just as much or less than claimed.

Per claim 9: A reactor further comprising a circular conduit for transferring a heat medium around the reactor. Examiner notes that nozzles 21 and 15 in Fig.1 of Takada et al are considered circular conduits are facilitate the transfer of a heat medium around the reactor.

Per claim 8: A reactor further comprising a baffle plate substantially horizontally disposed in the reactor (Takada et al, Fig.1, item 27).

Per claim 10: wherein different kinds of reactions are performed. The Examiner notes that the reactor disclosed by Takada et al is not limited to one specific reaction, but can be used in numerous different types of catalytic vapor phase oxidation reactions.

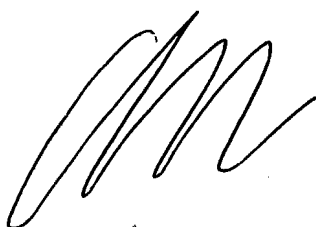
Per claim 11: A method for producing (meth)acrylic acid by the reaction of catalytic gas phase oxidation using a reactor set forth in claim 1. Since Takada et al generally teaches the use of the disclosed reactor in catalytic vapor phase oxidation reactions, it is reasonable to assume the reactor is readily capable of being used for

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producing (meth)acrylic acid.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex Wachtel whose telephone number is 571-272-1455. The examiner can normally be reached on 10:30am to 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Glenn Caldarola, can be reached at (571)-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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